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Factors which contribute to motivation in industrial arts laboratory activities

Benedict Chinedo Ogwezi
Iowa State University

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by

Benedict Chinedo Ogwezi

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DEDICATION

AFFECTIONATELY INSCRIBED

TO

My Mother who shared my concern for education

AND

Prof. William D. Wolansky who helped me bring it to fruition.

CHAPTER I. INTRODUCTION

For the past number of years there has been serious discussion on ways to reduce the high rate of school dropouts and provide training for salable skills to young people. As a consequence, the Nigerian nation has evolved a comprehensive secondary school system whose course of study should cover not only academic subjects, but should develop knowledge, skills, and attitudes relating to industry and its supporting technologies. Additionally, the introduction of industrial arts into such comprehensive schools can result in the improvement of technical and vocational education.

The Second Five-Year Project in Nigeria instituted a reform in the comprehensive schools on the post-elementary school level. Exploratory in nature, the reform established guidelines for industrial-technological specialization courses. This project was sponsored by the federal government with the financial support of the International Bank for Reconstruction and Development (Nigeria, Federal Ministry of Education, 1972, p. 18).

And yet, as similar plans in other progressive countries, including the United States, were examined, records revealed that developing human capabilities depended to a great extent on the students' motivation (Murray, 1964). Concerned with the concept of motivation in industrial Arts, Lee D. Carter

(1976, p. 66) made the following observation:

> Every teacher is well aware of the importance of motivation among his or her students. Industry also is cognizant of the importance of motivation among its employees. It has been stated many times that motivational momentum is a company's greatest hope for increasing profits. Motivation is the force at the store counter that impels people who have impulse to buy toward that counter. As a company must move minds, so educators must move minds.

Perhaps the most frequently utilized and effective manner of motivating students is through the application of theory into practice. Many laboratory practices can become too monotonous, and students' interest may decline. The same practices can become challenging and sustain student motivation and satisfaction. This does not mean that a knowledge of motivation was discounted or ignored. Institutions should realistically assess those skills which have proven to be effective in the past and be primarily concerned with implementing instruction that would insure the acquisition of necessary skills for future progress. There is a need for careful balance between theory and meaningful practice to sustain motivation for mastering both theory and practice. Margaret Mead did observe that:

> We must educate people in what nobody knew yesterday, and prepare people for what no one knows yet, but which some people must know tomorrow (Barnes, 1972, p. 28).

The theory-and-practice concept has enabled students to get a chance to acquire skills through actual experience. Many

instructors have turned their classrooms into workshops and incorporated theoretical concepts into practical learn-as-you-work laboratories. However, despite the accomplishments of the educational system generally, many schools are found ineffective. Difficulties which contribute to the ineffectiveness arise from various factors, many of which are still uninvestigated. Of these factors, student self-realization and human relations training pose as primary issues in the failure of the educational system to effectively motivate students. It has been observed in a recent study by Rosemary T. Fruehling (1976, p. 2):

> While cognitive and occupational skills are essential, however, additional skills are also needed if the individual is to make a smooth transition from the classroom to the work place. These skills are called career maturity skills, they involve human relations and coping skills, and they can directly affect a worker's chances of survival on the job.

The Fruehling study, conducted in the state of Iowa in the United States of America, primarily focused on those factors which contribute to motivation in industrial arts activities. The study identified the factors and indicated problems which reflect the reasons students show disdain in learning industrial skills or drop out of schools. This study also provides insight regarding students' interests in and concerns for issues related to the conditions in which students learn skills in industrial arts. One can argue that

frequently the learning environment, success in achievement and solutions for student retention can be found in motivation. With this study in mind, it is important to note the following remarks from the "U.N.E.S.C.O. Chronicle" of October, 1974:

> The renovation of education systems is today a necessity. . . . The first step in this renovation is a renewal and reconstructing of the content of education in the light of new factors which affect learning process . . . the need to make education a factor of social change and progress as well as a means of integrating the individual into the society (Ochs, p. 347).

In order to contribute to the effectiveness of the educational plans of the Nigerian nation, this study sought some experiences from a country whose practices in industrial arts in comprehensive high schools are widely recognized as progressive.

Problems of the Study

The problem of the study was to determine factors which affect motivation of students in industrial arts.

Objectives of the Study

1. To identify factors which students perceive to be important to their motivation.
2. To identify factors which instructors perceive to be important to students sustained motivation.
3. To provide school administrators with information that would help them motivate students.

Need for the Study

The significance of motivation in the management and execution of educational programs has been recognized for many years. Indeed, the increasing demands of industrial technology for more intricate motor skills performance require a further study in managing industrial arts programs. Stadt and Bailey (1973, p. 35) captured the significance of motivation in education as stated in the following observations:

> Although motivation also has been a prime concern in educational organizations, less financial resources have been available for research studies. Expanding educational legislation tends to direct the emphasis toward providing for the alienated in many sectors of our society. Everywhere, the ability to motivate people to achieve organizational goals is a very important function and a major challenge.

Frequently, governments and funding agencies in developing countries are mutually motivated by social and economic development in funding industrial arts programs. The partnership has never actually tackled problems related to the diversity of motivation factors. If industrial arts programs are to achieve purposeful goals, the educator must be aware of the factors which contribute to the effective or ineffective motivation of students. School curricula must be relevant to and geared toward the specific needs and particular interests of the students. Rene Ochs concurs with this concept in his article in the "U.N.E.S.C.O. Chronicle," October, 1974, as follows:

> It is the lack of relevance to school curricula, which too often takes no account of the problems and interests of the pupils or the conditions in which they learn, that is to a large extent to blame for high rates of wastage mainly in the form of repeating, which raises unit costs, thus resulting in the low efficiency of educational systems (Vol. XX, No. 10, p. 347).

The component industries of power, communication, materials, and processes are in the midst of the greatest technological revolution ever experienced. In graphic communication, new photographic materials and completely new processes are being developed and marketed; in metal and woodwork, the consumer market for the end products is demanding continued interest and study of industrial arts by young people.

In this situation, reasons abound for the study of factors which motivate students in learning industrial arts.

Basic Assumptions

1. Laboratory activity was a totalitarian concept which makes the teachers the sole legitimizers in the learning-teaching process.
2. Many laboratory activities frustrated the creative and innovative efforts students made by restricting student input to limited goals.
3. Students assumed a passive role in their acquisition of skills for the students' attention was focused on results that were, to the largest extent, acceptable

to the teacher.

4. There were motivating factors which needed to be identified to encourage the learning of industrial arts skills and concepts provided in Iowa's and all other schools.
5. The size of the population was sufficient to conduct the study.

Questions to be Answered

1. What factors do students in industrial arts rank high or low in motivation?
2. What factors do teachers in industrial arts rank high or low in motivation?
3. What are the common factors in motivation identified by both students and instructors?

Limitations of the Study

1. The study was limited to the three laboratory areas of graphic communications, woodwork, and metals.
2. The designated laboratory activities were exploratory in nature.
3. The age and experiences of the students varied, but the population was confined to students in junior or senior high school.

4. The study was limited to motivation in the industrial arts program in junior or senior high schools.

Definition of Terms

1. Industrial arts refers to: That phase of the educational program concerned with orienting individuals through study and experience to the technical-industrial sections of society for the purpose of enabling them to deal more intelligently with consumer goods, to be more efficient producers, to use leisure time more effectively and to act more intelligently in regard to matters of health and safety, especially as affected by industry (Good, 1973, p. 298).

2. Motivation in the practical affairs of the classroom or school laboratory refers to: (a) "Something the teacher does" to get children (students) to respond in certain ways. Inducements are offered by the teacher to his pupils and students as he tries to spark their interests and their efforts (Rosser, 1976, p. 126). (b) Motivation is related to man's inner impulses and is closely associated with his values. Motivation gives direction and intensity to man's behavior. It significantly affects his abilities and his achievements.

CHAPTER II. LITERATURE REVIEW

In the review of literature pertinent to this study, the term motivation was used as a key word index to research findings. Many studies were found that were primarily concerned with motivation; however, Arthur J. Rosser (1976) reported that only eleven studies have been devoted to teaching industrial arts within the last thirty years. Rosser's report (pp. 89-90) also disclosed that seventy-five percent of the studies have been conducted since 1970; the remainder were done between 1948 and 1969.

As it was found in Maddi (1972), Murray presented the idea of need for achievement as one of twenty-eight manifest needs of the individual. Over the years, a vast body of theories has accumulated on the change of human behavior. Maslow's theory of human needs (Lowry and Maslow, 1973, pp. 17-79), Sigmund Freud's theory of human personality (Mahler, 1945, p. 44), Hull's introduction of unobservable and intervening variables in human behavior (Birch and Veroff, 1966, p. 4), and Tolman's theory of goal-directed behavior (Birch and Veroff, 1966, p. 5) are only a few of the theoretical constructs on which contemporary research has been based.

A brief discussion on several studies is presented in the following review of studies specifically related to

motivation in industrial arts. Of the earlier studies, Lockette (1956) investigated the effects of the level of aspiration upon the learning of skills with 11th and 12th grade students. His experiment involved giving students a shop tasks in planing a piece of wood to pre-set dimensions. He worked under the following hypothesis:

1. That realistic students would be better satisfied with their performance than students whose level of aspiration was unrealistic.

2. That students whose levels of aspiration are realistic make more specific judgments with regard to what is needed to improve performance.

3. That students who have realistic levels of aspiration are more confident of their ability to improve performance.

From the results of the experiment, Lockette concluded:

1. That students who are treated realistically set lower goals, experience greater satisfaction and perform more efficiently in terms of achieving higher performance scores and making a larger number of improvements in their performance.

2. That students who are treated realistically are better able to specify their improvement needs and how they could improve their performances.

3. That goal-setting, either realistic or unrealistic, is superior to no goal-setting at all.

Lockette's findings support the general hypothesis that realistic and unrealistic levels of aspiration are goal determinants in the learning of skills. He found insufficient evidence to support the hypothesis that realistic students are more confident of their ability to improve.

Ward (1975, p. 4) made a study of Motivation and Discipline in Vocational Classrooms. One-hundred-thirty educators in the field were asked to write "one concept" on motivation and discipline. There were 144 statements on the final list. Subjects ranked these 144 statements in terms of importance in the classroom. Out of the total statements, Ward sorted out 25 motivation-related statements. These motivation-related statements has been ranked in the following order:

16. Always tell the students the purpose of the instruction.

22. Have resource people discuss new and emerging jobs and the training that might be required.

23. Set up teaching objectives which exercise a student's thinking, reasoning, judgment and creativity abilities.

27. Have former students who are successful speak to the class.

30.3. Challenge students to meet industrial world standards.

30.4. Have industry people speak, early in the term, on their expectations of employees.

34. Utilize questioning techniques to get all students involved.

36.3. Allow students to choose, with teacher's approval, their areas of specialization.

37. Stress the interesting challenges of the trade area.

40. Insure an accurate follow-up of graduates, and share the results with the students.

41.5. Do not criticize students for small errors; encourage, do not push.

42. Even if he only gets a part of the job right, praise him for that.

49. Make the students cost conscious by pointing out cost of tools, equipment, and materials.

52. Keep written records of students' achievements and individually go over them.

53. Subscribe to several area newspapers during job-hunting time. The classified sections may list many opportunities in the area.

56. Emphasize that a skilled person has a higher chance of always having a job.

60. Inform each student of where he stands at the end of each unit of instruction.

62. Require the students to plan as much of their work as possible.

63. Provide opportunity for in-class presentations by students (demonstrations, lectures, etc.). Each student should be given the opportunity to show that he can do something well.

66. Encourage students to share out-of-school experiences and tie to course content.

68. Reinforce students when they do a good job; what you reinforce is what you get.

78.5. Keep an up-to-date progress chart posted for each student.

84. Allow the students to assist in developing class content goals.

85. Set a time limit for all individual work projects.

87. Use physical activities frequently: change pace often.

99. Keep an up-to-date grade book which is open to the students.

100. Make the students evaluate their own projects.

101. Reward students for good attendance.

102. Figure a way to keep the shop open one evening a week for students who want to work extra.

104. Permit student choice of applicatory activity.

106. Have short, easy-to-score tests immediately after instruction.

111. Use peer evaluation of projects.

115. Place the responsibility for learning on the student as soon as possible. Get him "behind the eight ball" so he will have to work himself out of a problem situation.

116. If a qualified student finds work in his field, release him from school early (Rosser, 1976, pp. 89-90).

In a comparative study, Bernard Weiner (1969) did significant research on how thoughts and actions are associated with achievement and motivation. Weiner also investigated reward and punishment and evaluated them as a function of students' ability, motivation, and test scores. His experiment involved a hypothetical group of twenty high school students. Three factors were conveyed to the researcher: the students' ability, their expended effort, and their examination performance. The amount of reward and punishment was constrained to a zero-five scale. Weiner made the following findings:

1. That given either high or low motivation, low-ability students were rewarded more and punished less than high-ability students.
2. That given either high- or low-ability, hypothetical students who expend effort are rewarded more and punished less than those who did not expend effort (Weiner, 1969, p. 111).

Weiner's conclusion, illustrated in Figure 1, showed that low ability and high motivation increased performance evaluation.

Other research which had the concept of motivation as part of the total problem includes the study of Stelzner (1969) on factors which are considered to affect the motivation of creativity within an industrial setting. He used interviews and survey methods in the form of a detailed questionnaire study the following:

1. Factors such as conformity and change which inhibit the creative individual in the industrial setting.
2. Perspectives of problems encountered in implementing creativity.

From the results of the study, Stelzner concluded:

> Significant changes will have to occur in [laboratory] organization structure to realize the maximum potential available (in the students) (Stelzner, 1969, p. 2941-B).

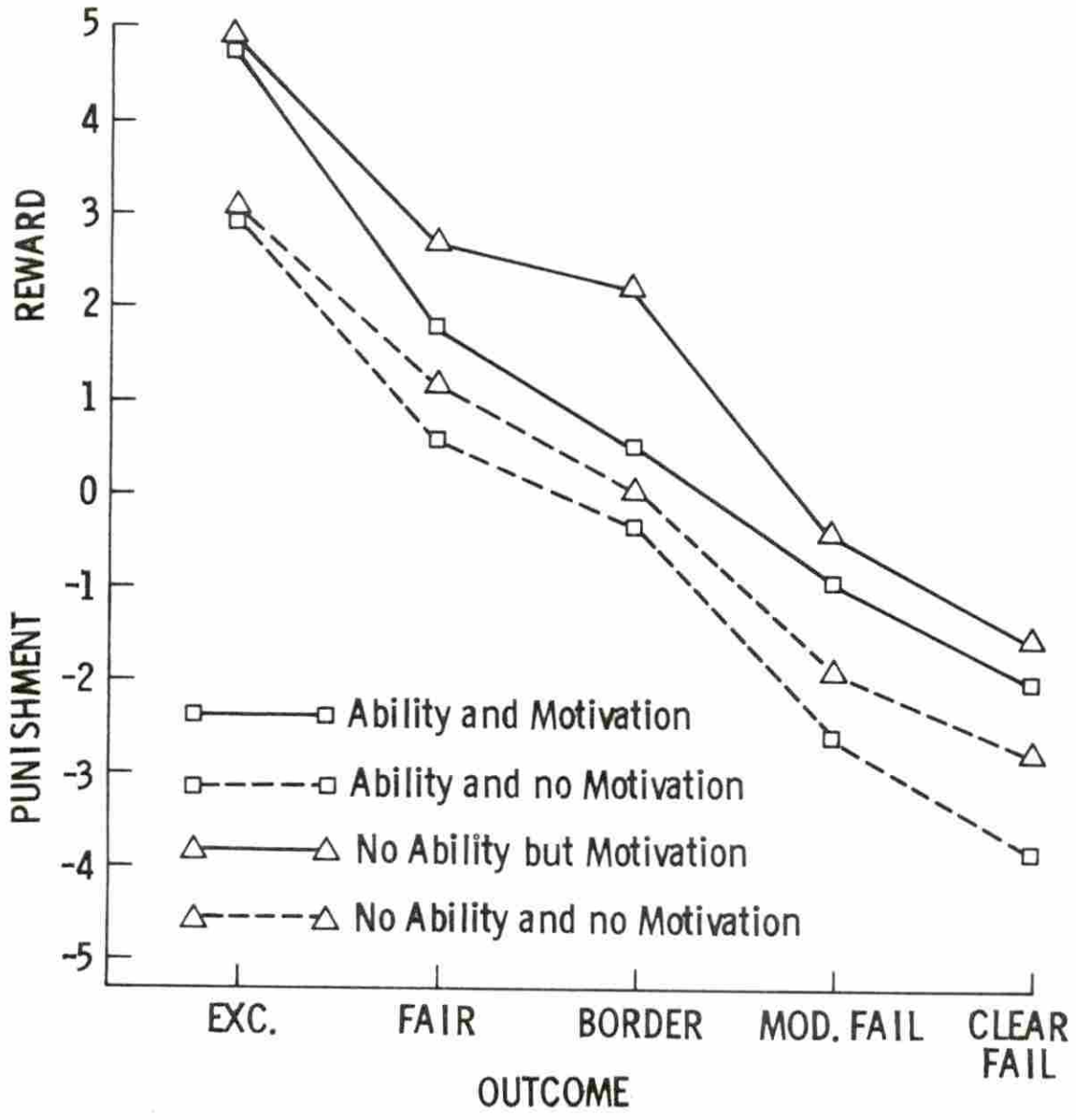

Figure 1. An illustration showing that low ability and high motivation increased performance evaluation (Weiner, 1969)

In 1972, Nachimias performed a survey on the determinants of educational motivation to formulate a theoretical framework which could accurately portray students' aspirations and teachers' expectation of individuals. He devised three major constructs:

1. Structural factors which referred to the nature of objective reality which decides an individual's structure of opportunity.
2. The interpersonal factors which indicated the amount of support a person receives from significant others.
3. The intrapersonal factors which referred to relatively durable attributes of the individual defining his capacity to respond to the social environment.

Nachmias worked under the hypothesis that:

1. The three major constructs provided conditions necessary to the occurrence of educational motivation.
2. Aspirations and expectations will not take place in the absence of either one of three conditions: available opportunities, perceptions of support by others, and personal capabilities.

Nachimias tested the propositions with two alternative models:

1. An additive model which presupposes that structural, interpersonal, and intrapersonal factors operate independently of each other; and
2. A multiplicative model which accounts for additional variation in educational motivation not previously accounted for by the independent operation of variables.

From the results of the study, the following conclusions were made:

1. That multiplicative relations are present only between two constructs at a time and that an interactive model is superior to an additive one in its explanatory utility.
2. That a synthesis between the two models, in a form of mixed model accounting for "main effects" results in the largest increase in explained difference over that accounted for by the additive model.

Nachimias' findings suggested that applying additive models en bloc to the study of educational motivation was futile and it was necessary to delineate interaction between the independent predictors of educational motivation in attempting to establish their results in degree of importance.

Dent (1972) perceived motivation to be a part of the total problem of his studies. Dent's study was based on a survey of students who indicated that the least motivating

factors in program selection were the choices that were made by their friends in school. The prime motivating factor, as indicated by Dent's study, was what the students saw as prospects for employment after completing high school.

The literature discussed up to this point has indicated that a combination of identified single factors were considered more accurate in predicting overall success in motivating an individual in industrial arts classes.

Motivation Theory

Industrial arts instructors work with the entire range of students including the students who are hard workers as well as students who avoid laboratory activities as much as possible. Such differences are explained in terms of low and high motivation. In this context, motivation becomes the prime mover of the student's behavior. It might be a description of observed results or consequences, or it might be a result of the complex interactions of uninvestigated factors. It is a summary of perplexing mysteries of man's actions that need explanations.

In search for an explanation, educators and psychologists have recorded their efforts and findings. Charles Butter (1968, p. 138) studied the neural mechanisms of internal regulation, the part of the nervous system which often involves

overt behavior. For example, a drop in environmental temperature triggers responses in the nervous system, such as the constriction of blood vessels, which tend to conserve body heat. Under such conditions, the human being also tends to preserve body heat through multi-varied measures including putting on additional clothing or closing windows. Butter's concept and study were based on similar behavioral adjustment which satisfy needs of the body.

Numerous theories have been proposed, books published and articles written in professional journals to indicate the extent to which motivation has been regarded as a crucial factor in human behavior. One of the outstanding theories was that provided by Maslow (1943), who organized human needs into a hierarchy of relative propensity. Robert Ebel (1965) and Sigmund Freud (1933) agree considerably with Maslow that the first need of man is physiological, the gratification of hunger. The basis of the study of human motivation is centered on the theory of the satisfaction of basic needs and the sequential emergence of other needs that surface to dominate the organism.

Often, various essential factors that affect motivation are not directly within the responsibility or reach of the industrial arts teacher. There are limitations and restrictions within the school set-up to enable the instructor to

motivate a student through his need for food, water and shelter. Since the desire for the basic needs of food, shelter and thirst are physiological and can be triggered off at any time and place, its recognition by instructors who relate to students frequently becomes a crucial issue.

This physiological need is the proponent of motivation and its gratification is a factor in a change of attitude towards learning. Hull (1943) recognized that the survival of the organism and its readiness to learn is a product of its association. Hull concludes that the industrial arts student must have been gratified if he or she:

a. shows no stress after mid-morning recess in the school;

b. is not from a food-deprived home;

c. does not show disposition against sustained, related classroom studies; and

d. shows no loss or defect in Milton's five gateways to knowledge - "sight, hearing, taste, smell, and touch".

Maehr (1960) studied the influence of food deprivation on perception. He used several college-age students who viewed stereograms on one side of which food objects were shown; on the other side, various nonfood objects were shown. The two pictures on the stereogram were devised so that the viewer, unaware that the effect of food deprivation was being investigated, tended to fuse the two pictures into one - that is, to see only one picture. When the subjects were deprived

of food much beyond their regular eating times, there was a tendency for them to see the food-object pictures more frequently. There was a particularly strong tendency for this to occur when the slides were viewed at or near the customary eating time. Maehr concluded that an individual's deeply-felt needs may influence his perception.

The safety theory

When hunger is relatively gratified, Maslow (1943) stated that man seeks assurances on safety, protection against danger or threats, job security, and insurance. He prefers the familiar to the unfamiliar; the known attracts him and he tends to keep his distance from the unknown. Dewey and Humber quoted the Krout study made among college students who were asked to keep a week's record of their wishes. The study showed that most of the subjects placed security as most vital among their wishes. From Krout's study, it became conclusive that actions which students interpret as unfair, unjust, or inconsistent are great threats to their sense of security. Families, instructors, and peers provide or destroy the safety or security each student needs. This attitude towards security often encourages a person to provide for the future.

In the industrial arts laboratory, the implications of the safety theory rest on the fact that instructors should

recognize when the laboratory is not reasonably safe for laboratory activities. The student's desire for security has not been gratified if:

1. He is unwilling to accept more responsibility.
2. He is afraid to take chances.
3. Shop accident precautions are not met and strictly enforced.
4. He resists complying with the instructor's requests.
5. He does not like to change laboratory activities (fear of failure).

Love or social need theory

Gratification of social needs, or desire for affection, was discussed in various sources within the literature. In Prescott's article, "The Role of Love in Human Development", he concluded that love is a genuine human reality and plays a most important role in human development. Out of his conceptions of the nature of love which may help teachers to understand the effects of known home relationships upon the development and behavior of individual students, Prescott (1957, p. 358) indicated that to feel that one is deeply valued regardless of how one looks or acts is to have a haven of safety in case of failure, indiscretion, guilt feelings or social rejection. Love, according to Prescott, promotes the development of personality characteristics that make the individual easy to get along with and attractive in

group situations.

For the students in industrial arts, affection needs depends on how students adapt to the group or are accepted by the instructor or other members of the group. Feelings of alienation and isolation are indications that the love or social need is not gratified.

Freud's theory (1933) was based on an assumption that the id is present at birth and demands gratification regardless of the consequences. Freud's theory probably accounts for the overt hostility demonstrated by students toward their instructors or peers. In almost every classroom there is the capable student who deliberately disobeys and disrupts class activities in order to arouse displeasure in the instructor or to express the desire for solitude.

The social factor must have been gratified if:

1. The student is amiable and/or compatible with the other members of the class and/or his instructor.
2. The student shows interest by participation in industrial arts social functions.
3. The student sees good points in the instructor and in the performance of every member of the industrial arts class.
4. The student tries to give assistance and attempts to please every member of the class.

5. The student is always seen with other students.

The self-above-all or self-significance theory

Literature reviewed on the self-above-all theory indicated conflicting conclusions and raised further questions on whether self-significance is either acquired, inherited, or actually a combination of these two possibilities. To a considerable extent, it was generally agreed that all people within any society (minus a few pathological exceptions) maintain self-significance. McDonald (1965, p. 151) stated:

> It is a basic human urge and even the student in industrial arts often fends off that which he interprets as threatening to his satisfactory self-perception; he is viewed as one who strives for that which "promises" to enhance his significance.

The implication of the theory is based on the belief that the manner in which a student attempts to satisfy his self-esteem contributes to the amount of attention he gives to his laboratory studies and personal conduct. Instructors must be sensitive to the varied needs and concerns of each student to properly motivate the student and to insure that the student's quest for self-esteem is identified and fulfilled. A student must have been motivated if he:

1. Often "proves his point" to his own satisfaction at least.
2. Does things (such as horseplay in the laboratory) to attract attention.

3. Does good work in order to be noticed.
4. Refers to influential acquaintances in the class or in the school.
5. Interrupts in-class discussions to get his points over.

The literature reviewed on this subject did not indicate that the awareness of self-above-all is universal among all industrial arts students. Sufficient descriptive analysis disclosed that instructors should strive to identify this factor in human behavior as the knowledge would enhance the implementation of ideas to motivate students.

Self-actualization theory

Student protests illustrate that even when all the physiological, safety, love, and esteem needs are gratified, the "higher-level" motivation factor may not have been attended to. In industrial arts, some students enter the course because they want to do so while others enter only because they have to. Behaviors of discontent and disregard for laboratory assignments and displaying careless workmanship and lack of pride in completed assignments are only a few of the ways students show distaste for a specific course in a curriculum. To be true to nature, self-actualization means the desire to pursue a course of personal aptitude out of a conviction that one is not forced into the learning

process. It is a desire to become what one is capable of becoming.

Prescott (1957) in describing the factors that operate in the development of the self - observed:

> I do not believe that purposiveness and creativeness can be eliminated from the human personality, because the tendency toward greater differentiation seems to be a law of nature. It occurs in the growth and development of the meaning that underlies selfhood (Prescott, 1957, p. 416).

With the implications of this theory in mind, the instructor of industrial arts must maintain vigilance to uncover the method by which each student will express this motive. A student who wants to be a great architect or mechanical engineer may show this aptitude in his early drafting classes and must be guided and encouraged. In this vein, an instructor must observe the relationship between him and the student in the laboratory. He must also discern the student's perception of his assignments and interpret the undercurrents behind the student's uninhibited remarks.

A student's self-actualization must have been gratified if he:

1. often suggests how a laboratory assignment would be better accomplished;
2. will "stick" with the laboratory assignment to its completion;
3. takes pride in his work;

4. wants to see definite results; and
5. is irritated when other students cause his efforts to fail.

Motivation Factors

From the literature review, it is evident that factors in motivation are classified as intrinsic and extrinsic.

The intrinsic factors are physiological and difficult to analyze because what motivates an organism depends upon a variety of factors, each involving different neural systems. Butter (1968, p. 157) supported this observation when he explained that learning, like other complex behaviors, requires a background of wakefulness and an optimal level of alertness. Murray (1964) viewed the hierarchy of forces operating within the individual (needs); behavior was seen as the result of the interaction between needs and strengths at a given time and the external situation pressure. According to Murray, the pressures might be intrinsic or social and are often perceived by the individual as having the potential for either harm or advantage. Sometimes an individual anticipates an event and then reacts in advance due to the actual extrinsic factors. However, it is beyond the scope of this paper to review the entire needs motivation literature; such reviews are to be found in (e.g. Byrne (1966)).

The extrinsic factors are social and easier to analyze because what motivates the organism may be a variety of factors, such as various types of rewards, insurance or security. The inventory may be limitless. What is remarkable is that these factors are not autonomous in actuating a change in the students and instilling in them the desire to learn. The research by McClelland (1976), on "The Achievement Motive", conducted at Wesleyan University from 1947 to 1966, affirms that even physiological discomforts do not become urges or drives until they are linked with the cues that can signify their presence or absence. Thus, research on external factors of motivation is essential to the instructor's sensitivity to such clues as: the influence of peers, updated laboratory facilities and equipment that are in line with modern equipment in the local industries, human relations within laboratory work periods, the dynamism of the instructor and other factors.

Additionally, since the present study is exploratory in nature and because motivation may be related to some standard of expected or predicted achievement, the age and educational level of the subjects are of relevance to the findings.

CHAPTER III. METHODOLOGY

The steps involved in this research were as follows:

1. A survey of the literature and pertinent research in similar areas of study was conducted.
2. The laboratory areas that were included in the study were defined.
3. From the literature reviewed, an inventory of factors in motivation was compiled.
4. A research committee meeting was held to discuss the study and the relevance of specific factors identified for the study. Valuable suggestions were also made as to the methods to attain successful research results.
5. Twenty factors were identified and a questionnaire developed for a pilot study. The questionnaire was presented to graduate advisors for evaluation.
6. A visit with the principals and staff of two high schools was made to obtain permission to conduct the pilot study.
7. Based on the results of the pilot study, the questionnaire was reconstructed, reviewed and approved by members of the research committee.

Sample Design

8. Area XI of the Iowa School District was selected for the study becase:
   a. The school district is cosmopolitan in its composition and because of its geographic location in Iowa.
   b. The school district is relatively small and representative of the industrial arts programs in Iowa.
9. Three educators in industrial arts were asked to select 15 schools each from the list of schools in Area XI which they felt represented good industrial arts programs in Iowa. (The following criteria were used to select the industrial arts educators.)
   a. College degrees in industrial arts and involved in administering industrial arts in schools of Iowa.
   b. Industrial experience.
   c. Presently teaching industrial arts in Iowa.
10. The table of random sampling was used to select 10 schools from the list of 45 schools supplied by the educators.

11. The sample population of 140 was distributed as follows: 29 instructors and 111 students from junior and senior high schools in Area XI school district.

Instrumentation

12. Due to the difficulties inherent in assessing attitudes by observing overt actions or by inference from group membership, two types of questionnaires were constructed for the students and the instructors, respectively (see Appendix A).
13. The questionnaires and cover letter (see Appendix B) were reviewed and improved as suggested by a panel of advisers.
14. Visits were scheduled and the researcher acquainted himself with the principals and superintendents. Letters were delivered to them to solicit permission and cooperation for carrying out the research.
15. Questionnaires were distributed to instructors to reflect the response of students in the areas of graphics, metals, and woodworking. One hundred forty questionnaires were distributed.

Collection of Data

16. In order to facilitate quick and high returns of the questionnaires, the researcher revisited the schools at times arranged with the instructors.
17. Through personal contacts with instructors, a total of 118 questionnaires were collected after 12 days of their distribution.
18. Stamped and self-addressed envelopes were left with several instructors. Six additional questionnaires were returned on different dates.
19. The researcher acknowledged the instructor's cooperation.

Analysis and Treatment of Data

20. The treatment of the information collected for this study included frequency counts, the mean, and percentages. Percentages were used to indicate the number of questionnaires that were returned. The mean was used to compare the responses to the problem relating to factors in motivation in industrial arts and the differences in the performances of motivated and unmotivated students.

21. The data were gathered and analyzed by comparing the responses of the two subgroups, namely the students and the instructors. Findings and conclusions were made following the analysis of the collected data.

CHAPTER IV. FINDINGS

One hundred forty questionnaires were sent out, one hundred twenty-four were returned, an 88.57 percent return rate. Ninety-six of the respondents were students, and twenty-eight were instructors.

Persons or factors which influenced students in their decision to study industrial arts were determined on a 5-point scale. Persons or factors receiving a mean rating of less than 2.5 on the scale were not considered as decisive influences, but were regarded as secondary influences in student's decisions.

As indicated in Table 1, 77 students stated that it was their own idea to study industrial arts. This number represented 80.2 percent of the students. Three students indicated that it was their parents who had influenced their decision to study industrial arts. Here they were permitted to select only one major influence which had some effect on their decision.

As indicated in Table 2, 92 students responded that they were very satisfied with their present course in industrial arts. This number represented 95.8 percent of the students. Two students indicated that they were not satisfied and 2 students did not respond to the question.

Table 1. Person or factor that had the most or least influence on student's decision

Person/Factor	Number of students	Percentage
Own idea	77	80.2
Teacher	7	7.3
Course required	6	6.3
Brother/sister	3	3.1
Parents	3	3.1
TOTAL	96	100.0

Table 2. Student's responses to their satisfaction in industrial arts courses

	Students Responding	Percentage
Very satisfied	92	95.8
Satisfied	2	2.1
No opinion	2	2.1
TOTAL	96	100.0

Table 3 illustrates that students generally agreed on common factors which motivated them. The mean responses were calculated on each factor and the distribution of means was used to rank the responses.

As shown in Table 4 students generally agreed with each other on factors which motivate them, but tended to disagree

Table 3. Factors in motivation as ranked by students

Factors	Graphics Student	Metals Student	Woodworking Student	All Students
1. Hobby interest	4.38	4.44	4.46	4.43
2. Enjoyment	4.38	4.40	4.46	4.41
3. Creativity	4.38	4.36	4.11	4.28
4. A chance to cooperate with others	3.88	4.32	3.67	3.96
5. Individual experimentation	3.76	4.05	3.84	3.88
6. New experience (what you do is new to you)	4.15	4.12	3.38	3.87
7. Enthusiasm for continuous learning	4.00	3.80	3.71	3.84
8. Future (long-term) reward	3.76	3.76	3.80	3.77
9. Reward (good grades, praise)	3.96	3.62	3.73	3.77
10. Dynamics of instructor	3.80	3.80	3.60	3.73
11. Competition (with self and others)	3.64	4.08	3.43	3.72
12. Possibility of attainment	4.03	3.60	3.26	3.63
13. Recognition	3.61	3.80	3.43	3.61
14. Interaction with others	3.65	3.72	3.28	3.55
15. Peers	3.40	3.60	3.46	3.49
16. Personal needs	3.07	3.64	3.71	3.47
17. Families professional or social status	2.92	3.52	3.35	3.26
18. Individual internal stress	2.88	3.40	3.31	3.19
19. Anxiety	2.88	3.24	2.97	3.03
20 Need for security	2.53	3.00	2.60	2.71

Table 4. Comparison of student's and instructor's factor ratings

Instructors Factors	$\bar{x}$	Graphic Students Factors	$\bar{x}$
1. Enjoyment	4.21	1. Enjoyment	4.38
2. New experience for the student	4.10	2. Creativity	4.38
3. Dynamics of the instructor	3.89	3. Hobby interest	4.38
4. A chance to cooperate with others	3.89	4. New experience (what you do or learn is new to you)	4.15
5. Personal needs	3.89	5. Possibility of attainment (chance of success)	4.03
6. Possibility of attainment	3.70	6. Enthusiasm for continuous learning	4.00
7. Peers	3.67	7. Reward (good grades, praise)	3.96
8. Hobby interest	3.66	8. A chance to cooperate with others	3.88
9. Reinforcement	3.64	9. Dynamics of instructor	3.80
10. Recognition	3.48	10. Future (long-term) reward	3.76
11. Creativity	3.35	11. Individual experimentation	3.76
12. Future (long-term) reward	3.32	12. Interaction with others	3.65
13. Individual experimentation	3.29	13. Competition (with self, with others)	3.64
14. Enthusiasm for continuous learning	3.28	14. Recognition	3.61
15. Competition	3.25	15. Peers (friends, classmates)	3.40
16. Families professional or social status	3.25	16. Personal needs	3.07
17. Interaction with others	3.07	17. Families occupation or social status	2.92
18. Individual internal stress	2.92	18. Individual internal stress	2.88
19. Needs for security	2.82	19. Anxiety	2.88
20. Anxiety	2.51	20. Need for security	2.53

Table 4 (Continued)

Metal Students Factors	$\bar{x}$	Woodworking Students Factors	$\bar{x}$
1. Hobby interest	4.44	1. Enjoyment	4.46
2. Enjoyment	4.40	2. Hobby interest	4.46
3. Creativity	4.36	3. Creativity	4.11
4. A chance to cooperate with others	4.32	4. New experience (what you do is new to you)	3.88
5. New experience (what you do is new to you)	4.12	5. Individual experimentation	3.84
6. Competition (with self and others)	4.08	6. Future (long-term) reward	3.80
7. Individual experimentation	4.05	7. Reward (good grades, praise)	3.73
8. Recognition	3.80	8. Enthusiasm for continuous learning	3.71
9. Enthusiasm for continuous learning	3.80	9. Personal needs	3.71
10. Dynamics of instructor	3.80	10. A chance to cooperate with others	3.67
11. Future (long-term) reward	3.76	11. Dynamics of instructor	3.60
12. Interaction with others	3.72	12. Peers (friends, classmates)	3.46
13. Personal needs	3.64	13. Competition (with self and others)	3.44
14. Reward (good grades, praise)	3.62	14. Recognition	3.43
15. Peers (friends, classmates)	3.60	15. Families occupation or social status	3.35
16. Possibility of attainment (chance of success)	3.60	16. Individual internal stress (internal conflicts)	3.31
17. Families occupation or social status	3.52	17. Interaction with others	3.28
18. Individual internal stress	3.40	18. Possibility of attainment	3.26
19. Anxiety	3.24	19. Anxiety	2.97
20. Need for security	3.00	20. Need for security	2.60

with the instructors on motivation factors. This is shown more clearly by Table 5.

Table 5. Correlation coefficients among instructor and student factor means

	Instructors	Metal Students	Graphic Students	Woodworking Students
Instructors	1.000000	-0.170198	-0.065559	-0.39153
Metal Students		1.000000	0.788176	-0.870294
Graphic Students			1.000000	0.791442
Woodworking Students				1.000000

As indicated in Table 6, 64.3 percent of the instructors agreed that their laboratory activities involved interdisciplinary arrangements (two of the instructors did not respond to the question).

Table 6. Interdisciplinary arrangement of laboratory activities

Responses	Yes	No	Percentage Yes
26	18	9	64.3

An attempt was made to determine the number of years the instructors had been teaching. An analysis of these data revealed a fairly even spread in the number of instructors in each category. Only 2 or 7.1 percent of the instructors had less than 2 years of teaching experience. Eight instructors had 5 to 10 years of teaching experience while the greatest number of the instructors, 13 or 46.4 percent, had been teaching for 10 or more years.

Table 7. Number of years of teaching experience

Teaching Experience	Frequency	Percentage
10 years or more	13	46.4
5-10 years	8	28.6
2-5 years	5	17.9
1 year	2	7.1
TOTAL	28	100.0

Table 8 indicates that 24 or 85.7 percent of the instructors who responded to the question had less than 5 years industrial experience. To determine how much industrial experience contributes to instructors' knowledge of the technical content they teach, instructors' responses were rated on a 5-point scale. Responses which received a mean rating of less than 2.5 on the scale were treated as not having very

great contribution to the technical knowledge content of the teachers.

Table 8. Number of years of industrial experience

Industrial Experience	Frequency	Percentage
None	5	17.9
2-5 years	19	67.9
5-10 years	2	7.1
10 years or more	2	7.1
TOTAL	28	100.0

It was found in Table 9 that 8 or 28.6 percent of the instructors considered that industrial experience has no contribution to the knowledge of the technical content they teach. The responses of 19, or 67.9 percent, of instructors expressed that industrial experience contributes very greatly to instructors' knowledge of the subject they teach.

Table 9. How much industrial experience contributes to the knowledge of technical content

Instructors	No Opinion	%	No Contribution	%	Very great Contribution	%
28	1	3.6	8	28.6	19	67.9

A majority of the instructors were highly qualified in their profession. A total of 13, or 46.43 percent, of the instructors had Master's degrees; 13, or 46.63 percent of the instructors had Bachelor's degrees. Only 2 or 7.14 percent had Associate degrees in their fields. This seems to suggest a practice of preferring people with college certificates to people with industrial experience without college certificates as industrial arts instructors. Table 10 indicates the number of instructors with their professional qualifications.

Table 10. Number of instructors with professional qualification

Master's Degree	Bachelor's Degree	Associate Degree
13 or 46.43%	13 or 46.43%	2 or 7.14%

Grading systems of various instructors were also investigated. It was found that most instructors in the schools adopt the A-F grading system. From a total group of 28 teachers, 24 or 85.7 percent of the instructors adopted the A-F grading system; only 4, or 14.3 percent, adopted the GPA (Grade Point Average). The Pass/Fail system received no responses from the instructors, which indicated that in high school it is not a popular grading system. Table 11 illustrates the distribution.

Table 11. Grading systems of the instructors in industrial arts

Grading System	Number of Instructors Responding	Percentage
A-F	24	85.7
GPA	4	14.3
Pass/Fail	0	0
TOTAL	28	

Another subject of concern in the study was the amount of opportunity the instructors give to the students who at any time failed to obtain a passing grade in the laboratory. The research sought to find if students were given the opportunity to repeat their assignments at a later date. A number of 23, or 82.1 percent, of the instructors indicated that they provided the students the opportunity to repeat their work; only 5, or 17.9 percent, of the instructors did not give the students a second chance. The study did not ask if the second chance given by the instructors was mandatory according to school policy.

Summary of Findings

A survey technique was used in the form of a questionnaire to gather data. Ninety-six students and 28 instructors took part in the survey. The students were from senior and junior high schools in Area XI School District in the State of Iowa. Twenty factors in motivation were identified for the study. Appendix A and B list the factors randomly.

From the data gathered, the following findings were evident:

1. A review of Table 2 indicated that students voluntarily enroll in industrial arts courses in high schools.
2. Only 3.1 percent of the students indicated that parents influence their decision regarding enrolling in industrial arts courses.
3. Table 3 indicated that 95.8 percent of the students who enrolled in wood, metal, and graphic communications in high schools were very satisfied with their courses.
4. A review of Table 4 shows that almost all the students agree on several common factors which motivate them in industrial arts. A comparison from the table included these factors:

a. Hobby interest

b. Enjoyment

c. Creativity

d. A chance provided by industrial arts for cooperation with others

e. Individual experimentation

5. Contrary to what was expected, Table 4 indicated that students ranked the following six factors as low motivation factors:

15. Peers

16. Personal needs

17. Families professional or social status

18. Individual internal stress

19. Anxiety

20. Need for security

6. In Table 6, the comparison indicated that students have a more unified opinion on common factors which motivate them than shared opinions with their instructors.

CHAPTER V. APPLICATIONS OF THE FINDINGS

The results of this study indicated that students in industrial arts have their own preferences as to what motivates them. Students' preferences of factors should be considered in order to insure maximum efficiency and continuity of educational programs and services for young people. As it was reported by Roggers (1962, p. 76), Walter Canon once said that the seeds of great discoveries are constantly floating around us, but they only take rest in minds well-prepared to receive them. Through this remark, Canon noted the need for instructors to explore every available method to insure that the students develop their innate capabilities.

Table 12 illustrated that many of the contributions to society were made by young people. For example, Blaise Pascal (1623-1662) wrote a book on geometry by the age of sixteen and invented the adding machine at nineteen. While it seemed that young people had not the suitable opportunity to develop their aptitudes, the results of this study also indicated that motivation is a propelling force which the instructors must use if the young people of today are to contribute to the challenge of our industrial technological culture.

Many psychologists support the position that motivation is internal and not external, but it is necessary to recognize the importance of various extrinsic rewards and how these

Table 12. List of some youths who made great contribution to the society

CHARLES DARWIN (1809-1882) At age 27 began his observations concerning the transmutation of species that led to formulation of his theory of evolution	ELI WHITNEY (1765-1825) Invented the cotton gin at age 28	SAMUEL COLT (1814-1862)[a] Made first wooden model of revolver at age 16, a metal model the next year, and patented first revolver at age 21.
SIGMUND FREUD (1856-1939) At 29 began studies which led to investigation of hysteria from a psychological viewpoint and later to his development of psychoanalysis.	ALEXANDER THE GREAT (363-323B.C.)[a] Ruled as King of Macedonia at age 20, conquered the civilized world by age 27.	MICHAEL ANGELO (1475-1564)[a] Sculptured his battle of the Centaurs at 17 and completed his famous Pieta and Bacchus sculptures by age of 26.
BLAISE PASCAL (1623-1662)[a] Wrote book on geometry by age 16, invented adding machine at 19.	CHARLES MARTIN HALL (1863-1914) At age 23 was the first man to produce aluminum by electrolysis.	THOMAS A. EDISON (1847-1913) Patented the first of his many inventions, an electrical vote recorder at 21.
ALBERT EINSTEIN (1879-1955)[a] Mastered the works of Euclid, Newton and Spinoza by age 15, began work on theory of space-time relativity at age 26.	JAMES WATT (1736-1819) Began work on his idea for a condensing steam engine at 25, patented the first practical steam engine at 33.	MICHAEL FARADAY (1791-1867) Inventor of electric motor, at 21 began work in electro-magnetic that led to his invention.
THE WRIGHT BROS., WILBUR (1867-1912) & ORVILLE (1871-1948) Began experimenting with aircraft in their twenties, successfully flew world's first powered airplane when Wilbur was 36 and Orville was 32.	PETER TCHAIKOVSKY (1840-1893) Wrote his first opera libretto at 28, his first complete opera (Undine) at 29.	ALEXANDER GRAHAM BELL (1847-1922) Worked on his idea for a wireless telephone in his twenties and patented the first telephone at 29.

[a]Adapted from Febun, 1967, p. 18.

Table 12 (Continued)

WOLFGANG MOZART (1756-1791)[a]	REMBRANDT VAN RIJN (1606-1669)	LUDWIG VAN BEETHOVEN (1770-1827)
Began writing musical compositions at 4, made his first tour as an accomplished musician at 6, wrote his first sonatas at 7 and completed his first symphony at age 8.	Began serious painting in oils at age 21, within a few years had become a prominent portrait painter.	Wrote his first musical composition at 13, pianoforte quartets at 15, had written and published his Opus 1 by age 23.

rewards affect student performance. When a student is allowed to feel personally responsible for a meaningful portion of his performance, and when an assignment involves doing something that is considered worthwhile by the student, the results of this study would support a prediction of increased performance.

Based on the results of this study, motivation factors are arranged in a two-level hierarchy. At the lowest level, the students ranked anxiety, individual internal stress, and need for security; at the highest level are hobby interests, enjoyment, and creative concerns.

The higher motivation factors, for example, hobby interests and creativity, should be maintained since we now can visualize students' expectations when they try to perform in a particular manner. The determinants of performance expectancies may be found in a student's past experiences, the actual instructional situation, and the level of communication between the student and his peers or between the student and his instructor.

The organization of instructional practices is another facet in the application of the motivation factors. In this regard, the most attention must be given to the course content to fit the needs of the students without sacrificing the objectives of industrial arts. The study did not focus on what motivates the instructors when they teach industrial

arts. For the objectives of the study, the instructors must provide the linkage between the interest of the students and the interest the instructors have in teaching the courses.

The application of the motivation factors ranked as high by the students requires pulling together many of the theories and work on motivation. Some assumptions also should be recognized: (1) students have many conscious and often complex and competitive goals; (2) most of the students' behavior is consciously goal-directed; and (3) students have affective reactions to the outcomes they obtain as a result of their behavior. An adequate understanding of these theories and the treatment of the assumptions shall enable the instructors to predict how specific individual students will react to specific instructional practices.

Instructors in industrial arts perform towards a rationale and structure for industrial arts subject matter (Richard, 1969).

1. Industrial arts is a study of industry. It is an essential part of education of all students in order that they may better understand their industrial environment and make wise decisions affecting their occupational goals.
2. Man has been and remains to be curious about industry, its materials, processes, organization, research, and services.

3. Industry is so vast a societal institution that it is necessary, for instructional purposes, to place an emphasis on conceptualizing a fundamental structure of the field, i.e., a system of basic principles, concepts, and unifying themes.

In order to accomplish these goals based on the rationale for industrial arts, the instructor should be the change agent. A change agent refers to any group or individual who attempts to influence the decision of others, regarding new ideas and practices. Instructors, parents, and guardians, and the information media have performed the role of change agents and agencies over the years.

The instructor must maximize what motivates the students to obtain the following changes:

1. Engage the students in behavior doing things which will enable them to understand the ideas and the reasons they engage in particular activities.
2. Engage the students in activities which reflect contemporary industrial practices.

From the results of this study, the indication that 80.2 percent of the students enroll in industrial arts on their own volition makes a difference. The instructor should explore actions which he considers necessary in the interest of the students provided that such actions conform within the established rationale and structure of industrial arts body of

knowledge. There may be several different alternatives: changing instructional methods and course content to provide hobby interests and creative concerns, or introducing a new way of doing a particular task.

In the application of these findings the instructor must be constantly alert when a student or his peers would apply an idea of any instructional practices which have no immediate or clear-cut objective reference. When students tend to follow the practice, many things they do are superficial; they often interrupt their activities and indulge in horseplay, make disturbing noises, or wear some unusual facial expressions as a result of a lack of definite direction.

Also, the instructor must be cognizant of anticipatory application of his ideas by the students. This occurs when the students accepts an instructor's idea and also applies this idea in anticipation that he may use the idea to perform better than his peers. When an instructor presents a variety of ideas for some anticipated creative projects, some students not only take written notes but also request for time to practice in the laboratory on their own in order that they will perform satisfactorily when the tasks are evaluated.

Constrained behavior may occur in the process of applying the finding of this study. For example, a student has

accepted the instructor's idea and would like to put the idea into practice, but is unable to do so. This inability may be constrained by ineffective communication or a possible controversy over the application of motivation factors perceived by the students and the identified factors of motivation and the instructional goals of the instructor in industrial arts. The instructor must communicate to the students the objectives of industrial arts in his teaching processes and make provisions for student experimentation to the degree that is possible. Constrained behavior may also result from lack of funds for the instructor to purchase varieties of tools, materials, or equipment in the laboratory to meet the individual experimentation which students rated high in motivation.

Application Processes

Six stages for the application of these findings may be delineated. At all the stages the instructor must use a suitable method of teaching which will encourage cooperation among students: at the unawareness stage, the student does not know what new idea the instructor has for the class except when the student is given a classwork schedule at the beginning of the quarter. The instructor must provide new technical information about tools, machinery, materials, and creative interests at the beginning of each quarter in order to sustain students' motivation. At the awareness stage, the student

knows about the instructor's new ideas or schedule of activities for the quarter but lacks details about it. This stage demands that the instructor be properly prepared in order to kindle those factors that motivate students. If the new idea involves creativity, the instructor should provide enough examples, further references, and additional time for students. At the information stage, the student develops interest in the new idea, gets facts about it, and sees possibilities of its use. The student's response at this stage and his sustained interest will depend on how the information is related to those factors which the student ranks high in motivation. Information on new products, tools, and processes in industry should be explored by the instructor and the information passed on to the students.

At the evaluation stage the student mentally tries out the information, weighs alternative processes or solutions to difficult aspects, and attempts to produce a result individually. Here, the instructor should show interest in the student's endeavor, praise the student's progress, offer advice, and refrain from rebuking any of the student's mistakes. At the trial stage, the student uses the idea on a smaller scale and deals with the problem of how to use the concept or idea based on the information received from the instructor. In this stage, the instructor should encourage students' creative ideas as well as group and individual experimentation.

Finally, at the application stage, the student has been properly motivated; his responses are positive; an effective communication has been established; he decides to use the information from the instructor continuously on a large scale in the school and at home and finds satisfaction in industrial arts.

Emphasis on students' interest as a factor in motivation does not mean that the instructor must merely "follow the interests of the students." The development of interest must be guided. The instructor must be skillful, and always start with the situations in which the students are already interested, and then provide for broadening of the students' interests through proper selection of applications.

CHAPTER VI. SUMMARY AND CONCLUSIONS

The purpose of this study was to provide school administrators and instructors with information that will help them motivate students, and to design a format that would enable industrial arts instructors to improve their teaching environment. The findings should serve as a resource, or perhaps even as a guide, to those setting up and operating industrial arts programs in comprehensive secondary schools in Nigeria.

Ten high schools, which included senior high schools, junior/senior high schools, and junior high schools were selected from the Area XI School District in Iowa. The schools were as follows: McCombs Junior High School; Perry High School; Collins Community Schools; Nevada Junior High School; Bondurant-Farrar Junior/Senior High School; Saydel Consolidated Woodside Middle School; Nesco Junior-Senior High School; Valley High School; Harding Junior High School, and Baxter Junior-Senior High School. Altogether, 124 persons, which included 96 students and 28 instructors, were used for the study.

The following questions were answered in this study:

1. What factors do students in industrial arts rank high or low in motivation?

2. What factors do teachers in industrial arts rank high or low in motivation, and
3. What are the common factors in motivation identified by both the students and instructors?

General Findings

The most important findings of the study were:

1. Students study industrial arts because it is their own choice to do so; only 20 percent of the students included in this study indicated that their study of industrial arts is due to external influences.
2. Most students (95.8 percent) who enrolled in industrial arts were satisfied with their courses. This study did not ask students to indicate the reasons why they were satisfied with their industrial arts program.
3. Students had a general agreement on what motivated them.
4. Students rated the following five factors as high in motivation:
   a. Hobby interest
   b. Enjoyment
   c. Creativity
   d. A chance provided by industrial arts for cooperation with others

e. Individual experimentation

5. Students and instructors did not agree on the same list of factors which are highly motivating to the students. This study was not primarily geared toward analyzing the discrepancies in the opinions of the students and instructors regarding motivating factors. Instructors rated the following five factors as high in student motivation.

   a. Enjoyment

   b. New experience for students

   c. Dynamics of the instructor

   d. A chance provided by industrial arts for cooperation with others

   e. Personal needs

6. Teaching experience - The study indicated that 25 percent of the instructors have been teaching one to five years; 75 percent had five or more years of teaching experience.

7. Industrial experience - It was found that 67.9 percent of the instructors had two to five years of industrial experience while 7.1 percent had five to ten years. An additional 7.1 percent of the instructors surveyed had no industrial experience or did not respond to the question.

8. Industrial experience was considered to be very important by 67% of the teachers. The instructors who had industrial experience indicated that their experience made a "very great" contribution to the knowledge of technical content in the courses they teach. The study did not ask for other sources of training, i.e., in-service training which could also contribute to upgrading skills in teaching industrial arts courses.

9. Most of the instructors were highly qualified in the profession. A total of 46.43 percent of the instructors had master's degrees and 46.43 had bachelor's degrees. Only two out of the 28 instructors included in the study had associate degrees. This seems to suggest a practice of preferring people with college degree qualifications as industrial arts instructors.

10. It was found that most instructors adopted the A-F grading system. Twenty-four (85.7 percent) of the instructors used the A-F grading system while only 4 (14.3 percent) had adopted the GPA (Grade Point Average); the Pass/Fail system received no responses from the instructors, which indicated that in high school, it is not a popular grading system.

11. Twenty-three (82.1 percent) of the instructors said they provided the students with the opportunity to repeat their work; only five (17.9 percent) of the instructors do not give the students a second chance.

Conclusions

The following conclusions were drawn from the study based on the findings:

1. There was greater agreement among students in various technical clusters of industrial arts as to the factors which were perceived to be important to their motivation than the agreement between students and their instructors.
2. Both students and instructors perceived two factors as critical to motivation--these were:
    2.1. possibility of attainment, and
    2.2 hobby interests.
3. The wide range of factors that motivate students are not limited only to directed activities in classroom and laboratory situations.

Recommendations

On the basis of the findings, the following recommendations were made:

1. Set up teaching objectives which reflect a student's consensus, stressing hobby interests and creative abilities.
2. Encourage student group activities and student experimentation.
3. Industrial arts courses should provide more insight into industries, creativity, and hobby interests rather than strictly providing orientation to various skills.

Further Research

1. A similar study should be initiated by using a different population of students and instructors in power and electrical courses in industrial arts programs.
2. A study should be initiated which would determine the most accurate combinations of factors for predicting motivation of beginning students in industrial arts programs.
3. Since hobby interest is one of the major reasons students enroll in industrial arts, the findings

should be used to determine curriculum modifications.

4. This study should be replicated within the next ten years to establish patterns of change in factors which motivate students in industrial arts programs.

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APPENDIX A

6163 Buchanan Hall
Iowa State University
Ames, Iowa 50013

May 12, 1977

Sir:

Permit me to introduce myself to you first, before I request your assistance.

My name is Benedict C. Ogwezi, a Nigerian citizen, studying at the Iowa State University, Ames, Iowa. I am studying towards my Master's degree in Industrial Education. The information obtained in this study will benefit Nigerian government's plan to develop Industrial Arts in Comprehensive Schools.

The problem of motivating students to undertake and continue their study in Industrial Arts has been of great concern to the educators and education ministries in my country. This survey instrument is being circulated to obtain informative data of the inventory on factors of motivation in the laboratory in particular.

Your school has been suggested among the names of ten high schools by a three man panel of experts for my study.

I shall appreciate your cooperation in responding to the statements/questions attached to this letter. A return stamped and self-addressed envelope has been enclosed for your convenience.

Thank you for your cooperation.

Sincerely yours,

Benedict C. Ogwezi

Approved by

Dr. W. D. Wolansky
Major Professor & H.O.D.

APPENDIX B

INSTRUCTORS OPINION SURVEY

Questionnaire: Factors which Contribute to Motivation in Industrial Arts Laboratory Activities.

Note: Please answer all questions. Your answers will be held confidential.

When students come to the laboratory, they are ready in various degrees for a challenge and achievement. During the period or after their activities, they encounter a myriad of psychological and practical problems sometimes as a result of time pressure, role conflicts, competition, and other factors which frustrate them. The purpose of the following questions and statements are to obtain data to analyze the factors which contribute to high or low motivation in laboratory learning. The study shall be useful in reducing problems of teaching and increasing learning in laboratory skills. Please read the following questions and statements carefully and respond to them as you consider appropriate.

SECTION A: GENERAL INFORMATION

1. Check the type of clusters or courses in which you provide instruction:

   ____Metal ____Graphic Arts ____Wood

2. Do laboratory activities involve interdisciplinary arrangements?

   ____Yes ____No

3. Check the number of years of your teaching experience.

   1. ____1 year

   2. ____2-5 years

   3. ____5-10 years

   4. ____10 years or more

4. Check the number of years of your industrial experience.

   1. ____none

   2. ____2-5 years

   3. ____5-10 years

   4. ____10 years or more

5. How much did your industrial experience contribute to your knowledge of the technical content you are teaching?

5	4	3	2	1
No Contribution				Very Great Contribution

6. Check below the type of degree you have obtained:

   1. ____Associate degree: Major_____

   2. ____Bachelors degree: Major_____

   3. ____Masters degree: Major_____

SECTION B: METHOD OF EVALUATION

7. What grading system does your school use?

   1. ____A-F
   2. ____Grade Point Average
   3. ____Pass/Fail
   4. ____Other (Please specify)

8. If the student fails to obtain a passing grade in the laboratory activities, can he or she repeat the work at a later date? ____Yes ____No

SECTION C: INVENTORY OF MOTIVATION FACTORS

Below you will find an inventory of factors, identified for the purpose of this study, that contribute to motivation. Please rate these factors as High or Low in terms of contributing to the motivation of students in your Industrial Arts Laboratory. Rate the factors in terms of your experiences and observations. Circle the appropriate rating for each factor.

	High				Low
	5	4	3	2	1
1. Competition	5	4	3	2	1
2. Dynamics of the instructor.	5	4	3	2	1
3. New experiences for the student.....	5	4	3	2	1
4. Reinforcement.....	5	4	3	2	1
5. Peers.....	5	4	3	2	1
6. A chance to cooperate with others.....	5	4	3	2	1
7. Families professional or social status.....	5	4	3	2	1
8. Interaction with others....	5	4	3	2	1
9. Individual internal stress.	5	4	3	2	1
10. Enthusiasm for continuous learning.....	5	4	3	2	1
11. Recognition.....	5	4	3	2	1
12. Personal needs.....	5	4	3	2	1
13. Needs for security.....	5	4	3	2	1
14. Enjoyment.....	5	4	3	2	1

	High				Low
	5	4	3	2	1
15. Future (long-term) reward..	5	4	3	2	1
16. Creativity.....	5	4	3	2	1
17. Hobby interest.....	5	4	3	2	1
18. Anxiety.....	5	4	3	2	1
19. Individual experimentation.	5	4	3	2	1
20. Possibility of attainment..	5	4	3	2	1

APPENDIX C

STUDENTS OPINION SURVEY

Questionnaire: Factors which Contribute to Motivation in Industrial Arts Laboratory Activities

Please answer all questions. Your answers will be kept confidential.

School: _____

The purpose of the following questions is to help determine the factors which contribute to high and low motivation and make you perform and enjoy Industrial Arts. Rate the factors in each case as they most closely express your opinion.

SECTION A: GENERAL INFORMATION

1. Check the type of course in which you receive instruction.

   ____metal ____graphic arts ____wood

2. Which person or factor influenced you most in deciding to take Industrial Arts in high school?

   ____a. Parents ____d. Own idea

   ____b. Brother or Sister ____e. Course required

   ____c. Teacher

3. To what extent are you satisfied with your present course in Industrial Arts? (Circle one appropriate rating)

Very Satisfied				Not Satisfied
5	4	3	2	1

SECTION B

Below you will find a list of factors, considered for the purpose of this study, that contribute to motivation. Please rate these factors as high or low in terms of how they represent your feelings. Circle the appropriate rating for each factor.

	High				Low
	5	4	3	2	1
1. Reward (good grades, praise).....	5	4	3	2	1
2. New experience in the laboratory/Industrial Arts classes (What you do or learn are new to you).....	5	4	3	2	1
3. Peers (your friends, classmates).....	5	4	3	2	1
4. Competition (with self and others).....	5	4	3	2	1
5. Families occupation or social status.....	5	4	3	2	1
6. Personal needs.....	5	4	3	2	1
7. Enjoyment.....	5	4	3	2	1
8. Creativity.....	5	4	3	2	1
9. Recognition.....	5	4	3	2	1
10. Need for security.....	5	4	3	2	1
11. Anxiety.....	5	4	3	2	1
12. Hobby interest.....	5	4	3	2	1
13. Future (long-term) reward.	5	4	3	2	1

	High				Low
	5	4	3	2	1
14. Possibility of attainment (chances of success)	5	4	3	2	1
15. Individual experimentation.	5	4	3	2	1
16. Interaction with others....	5	4	3	2	1
17. Enthusiasm for continuous learning.....	5	4	3	2	1
18. A chance to cooperate with others.....	5	4	3	2	1
19. Individual internal stress (internal conflicts).....	5	4	3	2	1
20. Dynamics of instructor.....	5	4	3	2	1